Amendments to the Claims:

1. (Currently	Amended) A method for producing a circuit description of a design,	
the method comprising:		
a) froi	n the design, selecting a first candidate sub-network that includes	
multiple circuit elements;		
b) gen	erating a parameter based on a set of output Boolean functions	
performed by the first selected candidate sub-network;		
c) usi	ng the parameter to retrieve a first replacement sub-network from a	
storage structure that stores replacement sub-networks, wherein the first replacement sub-		
network comprises multiple circuit elements, at least one circuit element being independently		
selectable;		
d) det	ermining whether to replace the first selected candidate sub-network	
with the first replacement sub-network in the design;		
e) if c	letermined to replace the first selected candidate sub-network, replacing	
the first selected candidate sub-network with the first replacement sub-network in the design; and		
———f)——ite	atively-performing-the selecting, generating, using, determining, and	
replacing, wherein during at least one iteration, a candidate sub-network selected from the design		
comprises at least one but	not all circuit elements of a replacement sub-network in the design	
f) fro	m the design, selecting a second candidate sub-network that includes at	
least one but not all circuit elements of the first replacement sub-network; and		
g) rep	lacing the second candidate sub-network in the design with a second	
replacement sub-network	from the storage structure.	

- (Currently Amended) A method for producing a circuit description of a design, 2. the method comprising:
- from the design, selecting a first candidate sub-network that includes a) multiple circuit elements;
- generating a parameter based on a set of output Boolean functions b) performed by the first selected candidate sub-network;
- using the parameter to retrieve a first replacement sub-network from a c) storage structure that stores replacement sub-networks, wherein the first replacement subnetwork comprises multiple circuit elements, at least one circuit element being independently selectable;
- replacing the first selected candidate sub-network with the first d) replacement sub-network in the design; and
- e) iteratively performing the selecting, generating, using, and replacing, wherein during at least one iteration, a candidate sub-network selected from the design comprises at least one but not all circuit elements of a replacement sub-network in the design
- from the design, selecting a second candidate sub-network that includes at least one but not all circuit elements of the first replacement sub-network; and
- replacing the second candidate sub-network in the design with a second replacement sub-network from the storage structure.
- (Currently Amended) The method of claim 2 further comprising identifying [[a]] 3. the set of output Boolean functions performed by the first selected candidate sub-network.
 - (Original) The method of claim 3, wherein the set of output functions includes 4.

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only one output function.

- 5. (Original) The method of claim 3, wherein the set of output functions includes a plurality of output functions.
- 6. (Currently Amended) The method of claim 3, wherein each circuit element of the <u>first</u> selected candidate sub-network has an output, and each circuit element's output provides a result of one output function performed by the <u>first</u> selected candidate sub-network.
- 7. (Currently Amended) The method of claim 3, wherein each circuit element of the <u>first</u> selected candidate sub-network has an output, and each output function performed by the <u>first</u> selected candidate sub-network is provided at only a circuit-element output that fans out of the first selected candidate sub-network.
- 8. (Currently Amended) The method of claim 3, wherein a particular circuit element of the <u>first</u> selected candidate sub-network has more than one output, and each output of the particular circuit element provides a result of one output function performed by the <u>first</u> selected candidate sub-network.
- (Currently Amended) The method of claim 2 further comprising:
 receiving a local function for each circuit element of the <u>first</u> selected candidate
 sub-network; and

identifying each output function from the received local functions.

- 10. (Currently Amended) The method of claim 9, wherein each local or output function is represented in terms of a binary decision diagram ("BDD"), and the <u>first</u> selected candidate sub-network has at least first and second circuit elements, wherein the <u>first</u> circuit element performs a first local function, and the second circuit element performs a second local function, wherein the BDD of a first output function is derived from the BDD of the first local function, and the BDD of a second output function is derived from the BDD's of at least the first and second local functions.
 - 11. (Previously Presented) The method of claim 2 further comprising receiving the design, wherein the design is a combinational-logic network; selecting additional candidate sub-networks; and

replacing at least some of selected additional sub-networks with replacement subnetworks retrieved from the storage structure;

wherein the replacement of the candidate sub-networks optimizes the combinational-logic network design.

- 12. (Currently Amended) The method of claim 2 further comprising receiving a logical representation of the design; and converting the logical representation of the design to a circuit-level representation; wherein selecting the <u>first</u> candidate sub-network includes selecting the <u>first</u> candidate sub-network from the circuit-level representation.
- 13. (Currently Amended) The method of claim 2, wherein the parameter is an index for storing the first replacement sub-network in the storage structure.

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- 14. (Original) The method of claim 13, wherein the index is a numerical index.
- 15. (Currently Amended) The method of claim 2, wherein the parameter is a set of indices for storing the <u>first</u> replacement sub-network in the storage structure.
- 16. (Original) The method of claim 13, wherein the set of indices includes an index for each function in the set of output functions.
 - 17. (Original) The method of claim 16, wherein the indices are numerical indices.
 - 18. (Currently Amended) The method of claim 2 further comprising:

before replacing the <u>first selected</u> candidate sub-network with the <u>first</u> replacement sub-network, evaluating whether to replace the <u>first</u> selected candidate sub-network with the <u>first</u> replacement sub-network;

wherein said replacing is based on the evaluation.

- 19. (Original) The method of claim 18, wherein the evaluating comprises computing a cost function.
 - 20. (Currently Amended) The method of claim 18 further comprising: selecting additional candidate sub-networks;

for each candidate sub-network:

identifying at least one replacement sub-network for each selected

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candidate sub-network;

evaluating each identified replacement sub-network; and

based on the evaluations, determining whether to replace the candidate sub-network with the replacement sub-network identified for the candidate sub-networks.

21. (Currently Amended) The method of claim 18, wherein using the parameter to retrieve the <u>first</u> replacement sub-network comprises using the parameter to retrieve several replacement sub-networks, the method further comprising:

evaluating each retrieved replacement sub-network to identify viable replacement candidates;

wherein the replacement sub-network that replaces the candidate sub-network is one of the viable replacement candidates.

- 22. (Currently Amended) A computer readable medium storing a computer program which when executed by a computer produces a circuit description of a design, the program comprising:
- a) a first set of instructions for selecting, from the design, a <u>first</u> candidate sub-network that includes multiple circuit elements;
- a second set of instructions for identifying a set of output functions
 performed by the <u>first selected candidate</u> sub-network;
- c) a third set of instructions for retrieving, based on the identified set of output functions, a <u>first</u> replacement sub-network from a storage structure that stores replacement sub-networks, wherein the <u>first</u> replacement sub-network comprises multiple circuit elements, at least one circuit element being independently selectable;

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d) a fourth set of instructions for replacing the first selected candidate sub-	
network with the first replacement sub-network in the design; and	
e) a fifth set of instructions for iteratively performing the selecting	;
identifying, retrieving, and replacing, wherein during at least one iteration, a candidate sub	-
network selected from the design comprises at least one but not all circuit elements of a	Ł
replacement sub-network in the design	
e) a fifth set of instructions for selecting from the design, a second candidate	2
sub-network that includes at least one but not all circuit elements of the first replacement sub	-
network; and	
f) a sixth set of instructions for replacing the second candidate sub-network	2
in the design with a second replacement sub-network from the storage structure.	
23. (Original) The computer readable medium of claim 22, wherein the set of output	t
functions includes only one output function.	
24. (Original) The computer readable medium of claim 22, wherein the set of output	t
functions includes a plurality of output functions.	
25. (Canceled)	
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26. (Currently Amended) A computer readable medium storing a computer program	n
which when executed by a computer produces a circuit description of a design, the program	n
comprising:	
a) a first set of instructions for selecting, from the design, a <u>first</u> candidate	c
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sub-network that includes multiple circuit elements;

- a second set of instructions for generating a parameter based on a set of output functions performed by the <u>first</u> selected candidate sub-network;
- c) a third set of instructions for retrieving, using the parameter, a <u>first</u> replacement sub-network from a storage structure that stores replacement sub-networks, wherein the <u>first</u> replacement sub-network comprises multiple circuit elements, at least one circuit element being independently selectable;
- d) a fourth set of instructions for replacing the <u>first</u> selected candidate subnetwork with the <u>first</u> replacement sub-network in the design; and
- e) a fifth set of instructions for iteratively performing the selecting, generating, retrieving, and replacing, wherein during ut least one iteration, a candidate subnetwork selected from the design comprises at least one but not all circuit elements of a replacement sub-network in the design
- e) a fifth set of instructions for selecting from the design, a second candidate sub-network that includes at least one but not all circuit elements of the first replacement sub-network; and
- f) a sixth set of instructions for replacing the second candidate sub-network in the design with a second replacement sub-network from the storage structure.
- 27. (Previously Presented) The computer readable medium of claim 26, wherein the set of output functions includes only one output function.
- 28. (Previously Presented) The computer readable medium of claim 26, wherein the set of output functions includes a plurality of output functions.

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- 29. (Currently Amended) The computer readable medium of claim 26, wherein the parameter is an index for storing the <u>first</u> replacement sub-network in the storage structure.
- 30. (Currently Amended) The computer readable medium of claim 26 further comprising:
- a set of instructions for, before replacing the <u>first</u> candidate sub-network, evaluating whether to replace the <u>first</u> selected candidate sub-network with the <u>first</u> replacement sub-network;

wherein said replacing is based on the evaluation.

31. (Previously Presented) The computer readable medium of claim 30, wherein the set of instructions for evaluating comprises a set of instructions for computing a cost function.